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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/780,606	02/19/2004	Jae-Hee Oh	9862-000026/US	3174

30593 7590 11/27/2006

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EXAMINER

NADAV, ORI

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 11/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/780,606

Applicant(s)

OH ET AL.

Examiner

Ori Nadav

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 September 2006.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 and 10-22 is/are pending in the application.
- 4a) Of the above claim(s) 3,4 and 10-22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 5-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-2 and 5-8 are rejected under 35 U.S.C. 102(e) as being anticipated by Watanabe et al. (6,503,794).

Regarding claim 1, Watanabe et al. teach in figure 1 and related text a semiconductor device comprising:

a cell array region A formed in a semiconductor substrate and including a capacitor having a lower electrode 25, 27 and an upper electrode 29, the lower electrode having a lower electrode height;

a peripheral circuit region B formed in the semiconductor substrate and including a first metal wiring, the first metal wiring 31 having a first metal height, and having a lower surface in a substantially planar orientation with a lower surface of the lower electrode 16 (the lower surface is touching the semiconductor substrate);

a first insulating layer 18 formed on the cell array region and the peripheral circuit region and having openings; and

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a second insulating layer 23, 28, 33, 37 formed on the first insulating layer 18, the first metal wiring 31 being arranged in the second insulating layer,

wherein the second insulating layer includes a first sub-layer 23 surrounding the first metal wiring 31 and a second sub-layer 28, 33, 37 formed on the capacitor, the first metal wiring and the first sub-layer, the second sub-layer including a lower layer 28 or 33 that is formed between the upper electrode 29 and the first metal wiring 31, and an upper section 37 that is formed over the upper electrode 29,

and the first sub-layer is distinct from the second sub-layer.

Regarding claims 2 and 5-8, Watanabe et al. teach in figure 1 and related text a first conductive plug (part of 25) extending through the first insulating layer to connect the lower electrode to the semiconductor substrate; and

a second conductive plug (part of 31) extending through the first insulating layer to connect the first metal wiring to the semiconductor substrate.

first gate structures (including source and drain) formed in the cell array region, the first insulating layer being formed on the first gate structures;

second gate structures (including source and drain) formed in the peripheral region, the first insulating layer being formed on the second gate structures;

a first storage node contact hole and a first bit line contact hole 12, 28 formed through the first insulating layer for exposing a first surface of the substrate in the cell array region;

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first metal contact holes formed through the first insulating layer for exposing the first and second gate structures and a second surface of the substrate in the peripheral region;

conductive plugs formed in the first storage node contact hole, the first bit line contact hole and the first metal contact hole, the first metal wiring being in electrical contact with the conductive plug in the first metal contact hole;

a capacitor formed in the second insulating layer in the cell array region, the capacitor being in electrical contact with the conductive plug in the first storage node contact hole; and

a second metal wiring 35 formed on the second insulating layer in the peripheral region, the second metal wiring being electrically connected to the first metal wiring,

wherein the peripheral region includes at least one of core circuitry peripheral circuitry and logic circuitry,

wherein the capacitor has a metal/insulator/metal structure, and

a bit line formed on the second insulating layer and electrically connected to the conductive plug in the first bit line contact hole through a second bit line contact hole formed through the second insulating layer, wherein the bit line and the second metal wiring are formed from a single metal layer.

Response to Arguments

Applicant argues that Watanabe et al. do not teach in figure 1 and related text a metal wiring having a lower surface in a substantially planar orientation with a lower surface of the lower electrode, because first metal wiring 31 has its lower surface ends at region 17, whereas the lower surface of the lower electrode 25 ends at the lower surface of insulating film 23.

The lower surface of the lower electrode 25 does not end at the lower surface of insulating film 23. The lower surface of the lower electrode 25 ends at the lower surface of insulating film 18, that is, at the semiconductor substrate. The first metal wiring 31 also has its lower surface ends at the lower surface of insulating film 18, that is, at the semiconductor substrate. Therefore, Watanabe et al. teach in figure 1 and related text a first metal wiring having a lower surface in a substantially planar orientation with a lower surface of the lower electrode, as claimed.

Applicant argues that Watanabe et al. do not teach in figure 1 and related text a second sub-layer including a lower layer that is formed between the upper electrode and the first metal wiring, because "dielectric material 28 is not an insulating layer", and because "Watanabe discloses either a dielectric material 28, an electrode conductor 27, or a wiring 32 formed between the upper electrode 29 and the first metal wiring 31, and no "lower layer"."

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Although dielectric layer 28 is used as a capacitor dielectric, dielectric layer 28 insulates the upper capacitor electrode from the lower capacitor electrode, and thus can be considered as an insulating layer.

Furthermore, elements 28 or 33 are recited as being the "lower layer". These elements are clearly formed between the upper electrode 29 and the first metal wiring 31,

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ori Nadav whose telephone number is 571-272-1660. The examiner can normally be reached between the hours of 7 AM to 4 PM (Eastern Standard Time) Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Elms can be reached on 571-272-1869. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



O.N.
11/21/06

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PRIMARY EXAMINER
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